

REMARKS

This Preliminary Amendment is filed prior to initial review of the Application. Currently, claims 1, 4-6, 10, 13, 16-18, 21, 22, 33, 35, 36 and 40 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,733,256 (Costin) and claims 3, 7, 15, 19, 23, 34 and 37-39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Costin in view of U.S. Patent No. 5,609,576 (Voss et al.)

To anticipate a claim under 35 U.S.C. §102(b), Costin (U.S. Patent No. 5,733,256) must teach every element of the claim. “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). A prima face case of anticipation has not been met because Costin does not teach the irrigation system, medical system or apparatus as set forth in prior pending independent claims 1, 13 and 35, respectively.

In particular, the micro electro-mechanical systems (MEMS) capacitive pump sensor (1000) of Figure 10 operating in conjunction with the console (400) of Figure 4 does not teach or even suggest the structural and functional nature of the accumulator (pressure sensor) in fluid communication with the controller as claimed. Applicants respectfully request the Examiner to reconsider the claims as amended and to contact the undersigned attorney to schedule a telephone conference to facilitate prosecution of this matter.

Applicant has added claims 41-50 and respectfully request examination of these claims.

VERSION SHOWING MARKED CHANGES TO THE APPLICATION

IN THE CLAIMS

1 1. (Twice Amended) An irrigation system for a medical device, comprising:
2 an irrigation reservoir;
3 [a pump coupled to said irrigation reservoir;]
4 an irrigation line coupled to said irrigation reservoir [pump];
5 a pump coupled to said irrigation line;
6 an accumulator pressure sensor including a first chamber in fluid communication with
7 said irrigation line, a second chamber, and a flexible membrane that separates said first
8 chamber from said second chamber and deflects in response to a change in an amount of
9 fluid pressure in the irrigation line; and,
10 a controller including a pressure transducer in fluid communication with said second
11 chamber to detect a change of fluid pressure in said second chamber caused by the deflection
12 of the flexible membrane and to adjust a flowrate of fluid passing through said irrigation line
13 to counteract the change in the amount of fluid pressure in the irrigation line by varying a
14 speed of said pump.

1 2. Cancelled.

1 3. The irrigation system of claim 1, further comprising a valve coupled to said
2 irrigation line and said controller.

1 4. (Amended) The irrigation system of claim 1, wherein said controller activates
2 an indicator to provide a warning to replace said irrigation reservoir [controls a speed of said
3 pump and a flowrate through said irrigation line].

1 5. (Twice Amended) The irrigation system of claim [4] 1, wherein said
2 controller varies said pump speed in response to a variation in the irrigation line pressure
3 sensed by said pressure transducer that rises above a desired range of pressures.

1 6. The irrigation system of claim 1, wherein said controller can determine a
2 flowrate generated by said pump.

1 7. The irrigation system of claim 6, wherein said controller determines an actual
2 fluidic resistance from the flowrate and provides an output signal if the actual fluidic
3 resistance is greater than a threshold value.

1 8. The irrigation system of claim 6, wherein said controller determines an actual
2 volume of irrigation fluid pumped by said pump from the flowrate and provides an output
3 signal if the actual volume of irrigation fluid is greater than a threshold value.

1 9. Cancelled.

1 10. Cancelled.

1 11. Cancelled.

1 12. Cancelled.

1 13. (Twice Amended) A medical system, comprising:
2 an irrigation system that includes[;]
3 an irrigation reservoir,[;]

4 an irrigation pump that is coupled to said irrigation reservoir₁[;]
 5 an irrigation line coupled to said pump₁[;]
 6 an accumulator pressure sensor including a first chamber in fluid
 7 communication with said irrigation line, a second chamber, and a flexible membrane
 8 that separates said first chamber from said second chamber and deflects in response to
 9 a change in an amount of fluid pressure in the irrigation line₁[;] and,
 10 a controller including a pressure transducer in fluid communication with said
 11 second chamber and to control the pressure within said irrigation line through
 12 monitoring a change of fluid pressure within said second chamber of said
 13 accumulator pressure sensor; and
 14 an aspiration system that includes[;]
 15 an aspiration pump₁[;]
 16 an aspiration line coupled to said aspiration pump₁[;] and
 17 an aspiration pressure sensor that senses a vacuum pressure within said
 18 aspiration line[;]
 19 a medical device that is coupled to said irrigation line and said
 20 aspiration line].

1 14. Cancelled.

1 15. Cancelled.

1 16. (Amended) The medical system of claim 13, wherein said controller maintains
 2 an intraocular pressure by varying [controls] a speed of said irrigation pump and a flowrate
 3 through said irrigation line.

1 17. (Twice Amended) The medical system of claim 16, wherein said
2 controller varies said [pump] speed of said irrigation pump in response to a variation in fluid
3 pressure in said first chamber of said accumulator pressure sensor as [the irrigation line
4 pressure] sensed by said pressure transducer.

1 18. The medical system of claim 13, wherein said controller can determine a
2 flowrate generated by said irrigation pump.

1 19. The medical system of claim 18, wherein said controller determines an actual
2 fluidic resistance from the flowrate and provides an output signal if the actual fluidic
3 resistance is greater than a threshold value.

1 20. (Amended) The medical system of claim 18, wherein said controller
2 determines an actual volume of irrigation fluid pumped by said irrigation pump from the
3 flowrate and provides an output signal if the actual volume of irrigation fluid is greater than a
4 threshold value.

1 21. (Amended) The medical system of claim 19, wherein said controller provides
2 an output signal that is used to control [reduces a] power of a [said] medical device that is
3 coupled to said irrigation line and said aspiration line if the actual fluidic resistance is greater
4 than a device threshold value.

1 22. (Amended) The medical system of claim 19, wherein said controller changes
2 a speed of said aspiration pump if the actual fluidic resistance is greater than a [pump]
3 threshold resistance value.

1 23. Cancelled.

1 24. Cancelled.

1 25. Cancelled.

1 26. Cancelled.

1 27. Cancelled.

1 28. Cancelled.

1 29. Cancelled.

1 30. Cancelled.

1 31. Cancelled.

1 32. Cancelled.

1 33. Cancelled.

1 34. Cancelled.

1 35. (Twice Amended) An apparatus, comprising:
2 an irrigation pump;

3 an irrigation line in fluid communication with the irrigation pump;
4 a first pressure sensor in fluid communication with the irrigation line;
5 [a medical device in fluid communication with the irrigation line to provide irrigation
6 fluid;]
7 an aspiration line [in fluid communication with the medical device to aspirate fluid];
8 a second pressure sensor in fluid communication with the aspiration line;
9 an aspiration pump in fluid communication with the aspiration line; and,
10 a controller coupled with the first and the second pressure sensors to sense a
11 differential pressure between the irrigation line and the aspiration line and to vary a speed of
12 the irrigation pump in efforts to maintain a flow rate in the irrigation line substantially in
13 proportion to the flow rate in the aspiration line.

1 36. Cancelled.

1 37. (Amended) The apparatus of claim [35] 40, further comprising:

2 a first accumulator between the irrigation line and the first pressure sensor, the first
3 accumulator including a first chamber in fluid communication with the irrigation line
4 temporarily to provide said fluid in response to dislodgment of an occlusion of the aspiration
5 line after the occlusion has already caused a substantially reduced speed of the irrigation
6 pump, a second chamber in fluid communication with the first pressure sensor and a flexible
7 membrane which separates the first and the second chamber.

1 38. The apparatus of claim 37 wherein the first accumulator is sized to maintain
2 an intraocular pressure of an eye into which the medical device is to be inserted.

1 39. The apparatus of claim 37, further comprising a second accumulator in fluid
2 communication with the second chamber.

1 40. The apparatus of claim 35, wherein the controller is further to determine that
2 an occlusion of the aspiration line has occurred if the differential pressure increases.

1 41. (New) An irrigation system for a medical device, comprising:
2 a pump;
3 an irrigation line coupled to said pump;
4 a controller that varies a speed of said pump to adjust a flowrate of fluid passing
5 through said irrigation line; and
6 an accumulator including (i) a first chamber operating as a reservoir to store fluid
7 separately from and fluid passing through said irrigation line, (ii) a second chamber and (iii)
8 a flexible membrane that separates said first chamber from said second chamber, said
9 accumulator provides said fluid from said first chamber to said irrigation line to maintain
10 intraocular pressure of an eye.

1 42. (New) The irrigation system of claim 41 further comprising an irrigation
2 reservoir coupled to said irrigation line.

1 43. (New) The irrigation system of claim 42, wherein said fluid from said first
2 chamber is provided to said irrigation line to mitigate transit latency of fluid from said
3 irrigation reservoir.

1 44. (New) The irrigation system of claim 41, wherein said flexible membrane of
2 said accumulator is deflected in response to a change in fluid pressure in said irrigation line
3 and causes a change in fluid pressure in said second chamber.

1 45. (New) The irrigation system of claim 44, wherein said controller including a
2 pressure transducer in fluid communication with said second chamber to detect the change of
3 fluid pressure in said second chamber caused by deflection of said flexible membrane and to

4 adjust a flowrate of said fluid passing through said irrigation line to counteract the change in
5 fluid pressure in said irrigation line by varying the speed of said pump.

1 46. (New) The irrigation system of claim 42, wherein said controller activates an
2 indicator to provide a warning to replace said irrigation reservoir.

1 47. (New) An irrigation system for a medical device, comprising:
2 an irrigation line;
3 a pump coupled to said irrigation line;
4 an accumulator pressure sensor including a first chamber in fluid communication with
5 said irrigation line, a second chamber, and a flexible membrane that separates said first
6 chamber from said second chamber and deflects in response to a change in an amount of
7 fluid pressure in the irrigation line; and,
8 a controller including a pressure transducer in fluid communication with said second
9 chamber, the controller to detect a change of fluid pressure in said second chamber caused by
10 the deflection of the flexible membrane and to adjust a flowrate of fluid passing through said
11 irrigation line to counteract the change in the amount of fluid pressure in the irrigation line by
12 varying a speed of said pump.

1 48. (New) The irrigation system of claim 47, wherein the first chamber of the
2 accumulator operating as a reservoir to store fluid separately from fluid passing through said
3 irrigation line, said fluid provided from said first chamber to said irrigation line to
4 temporarily maintain intraocular pressure of an eye

1 49. (New) The irrigation system of claim 48 further comprising an irrigation
2 reservoir coupled to said irrigation line.

1 50. (New) The irrigation system of claim 49, wherein said fluid from said first
2 chamber is provided to said irrigation line to account for a delay of additional fluid being
3 provided from said irrigation reservoir.

CONCLUSION

In view of the foregoing, Applicants contend that the pending claims are in condition for allowance and respectfully request the Examiner to reexamine these claims. Allowance of these claims at Examiner's earliest convenience is respectfully solicited.

Respectfully submitted,

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CERTIFICATE OF MAILING

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on: August 10, 2001.

Corrinn R. Reynolds 08/10/01
Corrinn R. Reynolds Date